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MEMORANDUM
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OF

OBJECTS OF GEOLOGICAL INTEREST

IN THE

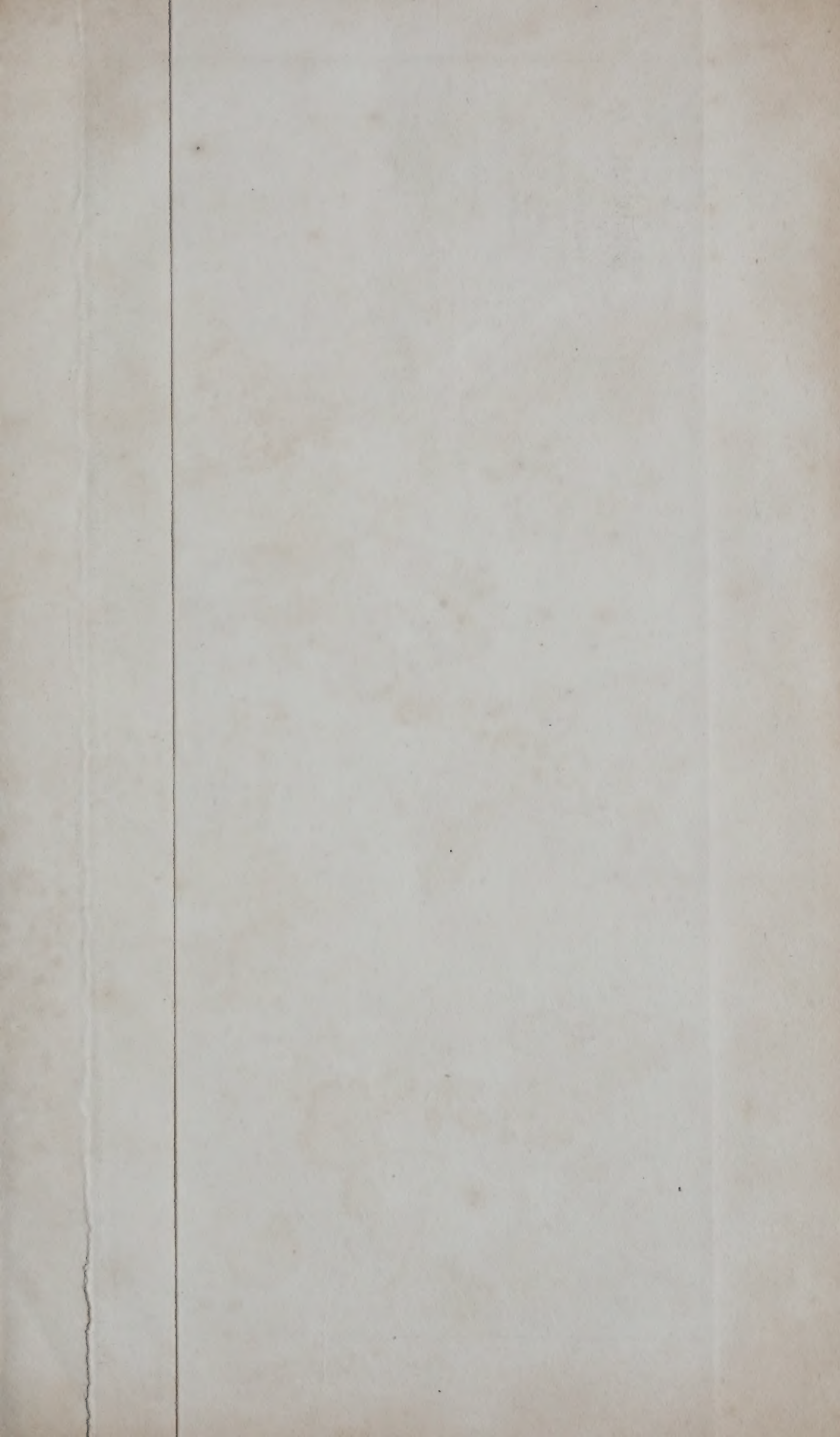
VICINITY OF DUBLIN.

DRAWN UP AT THE DESIRE OF THE ROYAL DUBLIN SOCIETY, PREPARA-
TORY TO THE MEETING OF THE BRITISH ASSOCIATION
IN AUGUST, 1835.

DUBLIN:
R. GRAISBERRY,
PRINTER TO THE ROYAL DUBLIN SOCIETY.

1835.





ENGRAVED BY
J. KIRKWOOD DUBLIN.

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Irish Miles

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Lambay Island



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INTRODUCTION.

THE vicinity of Dublin offers a great variety of interesting matter for the study of the geologist. Within a very limited distance from the capital, we are presented with an important series both of primary and secondary rocks. To the south of the bay of Dublin, PRIMARY ROCKS alone occur; which are remarkable not only from their variety, but from the indications of violence exhibited in the contortions of the strata, the intrusion of granitic veins into the micaceous schist, and the chemical changes which the schists have suffered when in contact with the granite. The primary rocks of the vicinity of Dublin consist of a central ridge of granite, on each side of which the micaceous and argillaceous schists, the quartz rock, and mountain limestone are arranged. This granite chain extends from Kingstown on the North into the county of Waterford on the South, a distance of nearly sixty miles. In the vicinity of Dublin the course of the granite chain is well ascertained : it

extends from Dalkey Island to Black-Rock, and from thence passes southward to Dundrum and Rathfarnham; it then crosses the Military Road behind Montpellier hill, and running across the northern extremity of Glenismaule, forms the basis of Seechon, and consequently supports the schist which constitutes the greater portion of that hill. On the east, that is, next the sea, the boundary of the granite is very apparent; from Dalkey it runs along the shore to Killiney, from thence it runs inland to Rochestown hill, extending in nearly a right line to the Scalp, passing on to Glencree and Lough Dan, holding a southerly course.

This central granite ridge includes some of the loftiest hills in the vicinity, they are, however, rivalled by the adjoining quartz mountain, called the greater Sugar Loaf,* and the schistose mountains of Seechon and of Djouce. This granite ridge is destitute of the sharp and spiry outlines which so often characterize mountains composed of this rock; a circumstance apparently dependant on the inconsiderable elevation of the hills, and also on the very decom-

* See Appendix for table of the heights of these mountains.

possible nature of some of the kinds of this rock, which disintegrate rapidly with exposure to the weather.

The mineral nature of the granite in general exhibits, nevertheless, but little variety, and is almost completely free from hornblende or other ingredients, not essential to its character. The felspar is for the most part of a pearly whiteness, and forms a striking contrast with the black mica. The stone is much employed for architectural purposes in Dublin and the vicinity, and considerable quantities of it are exported to Liverpool, and there employed for paving the streets. Near Killiney, at the junction of the granite with the schist, the quality of the former is rather different from that obtained in the quarries near Kingstown. It is harder; and the mica, instead of occurring in plates, has assumed the form of plumose mica. At Glencullen, Glenismaule, &c., the granite is more coarse-grained and the mica is of light colour, forming large hexagonal plates, sometimes half an inch in breadth. This variety is less compact than the granite of Killiney, and contains more felspar and mica; hence, perhaps, its more decomposable nature. In the vicinity of Glenismaule the granite is often completely disintegrated for a depth of four feet or more; and the de-

cay of the rock would proceed with great rapidity, if the covering of peat did not afford a protection against the destructive effects of the weather. This decomposed granite sand is brought to Dublin under the name of freestone, and is employed for scouring and other domestic purposes.

The mass of granite, whose limits have been defined, is almost every where in contact with the micaceous schist, both on its western and eastern flanks, and the junction of the rocks may be studied at Killyliney, the Scalp, and Rathfarnham. In the first of these situations, the schist is seen resting on its upturned edges, on a basis of granite, and traversed by numerous veins of that substance. As the granite veins run in two directions they often intersect, and one set runs parallel to the lamination of the schist, while a second set cuts across the strata. Many of these veins contain fragments of the schistose rock. Along the line of junction of the two rocks, the schist is much curved, and contains abundance of crystals of chiastolite arranged in stelliform groups. The schist is not the only rock which is in contact with the granite; for, from Black-Rock to Dundrum, the limestone succeeds the granite, and consequently the whole series of primary strata are absent. The ac-

tual contact of the two rocks has not been observed ; but at Black-Rock they are within a few yards of each other ; and the limestone is extremely compact, consisting of angular fragments, as if it had been shivered into small pieces and subsequently reunited. The quartz rock of Shankhill, if not in actual contact with the granite, is only separated from it by the intervention of a thin film of micaceous schist ; and at Ballinascorney, the argillaceous schist is not far removed from the granite ; but, as the two schists graduate into each other, it is not easy to characterize them, in every instance, by precise mineralogical distinctions.

The MICACEOUS SCHIST occurs both on the eastern and western flanks of the granite ; on the east it commences at Killiney, occupies the eastern side of Rochestown hill, and extends from thence to the Scalp, where it is seen reposing on the granite, much contorted, and containing crystals of Andalusite. From the Scalp, it passes to the west of Enniskerry, and constitutes the rocks of Powerscourt waterfall ; and still continuing its southerly direction, it passes by the head of Glencree, constitutes Djouce mountain, and may be seen in contact with the granite at the upper extremity of Loch Dan.

On the western side, the micaceous schist commences at Rathfarnham, and the junction of the two rocks may be seen, on the road side, near the commencement of the Military Road ; it then runs across Glenismaule and forms the mountain of Seechon.

The micaceous schist exhibits the usual mineral characters of that rock, and consists of a mixture of quartz and mica, in variable proportions. Sometimes alternating laminae of the two ingredients are so fine that the mica appears to preponderate, and the quartz is not so apparent : on the other hand, the quartz sometimes attains the thickness of an inch, and almost excludes the mica. Not unfrequently the quartz is replaced by argillaceous laminae, and thus the rock passes into an argillaceous schist ; which, when in contact with the granite, is sometimes changed into hornblende schist. At Killiney the schist exhibits a peculiar mode of decomposition, which it is difficult to explain. At first little circular depressions may be observed in the schist, and as these enlarge, little cavities are formed, often the size of an orange, and giving the rock a remarkably corroded appearance, as if it had been an amygdaloid which had lost its mineral nodules. This, however, is not the case in the present instance, for the cavities are not caused

by the falling out of nodules or portions of conglomerate, but appear to depend on some ill understood concretionary structure.

The mica schist is followed by ARGILLACEOUS SCHIST and QUARTZ ROCK; the former occurring on both sides of the granite chain, whilst the latter is only found on its eastern side : quartz rock also appears on the north side of the bay, constituting the peninsula of Howth. The schist occurs in continuous strata, which may be traced over a wide extent of country, but the quartz rock is found only in detached portions.

On the eastern side of the granite ridge, the argillaceous schist, being the outermost of the rocks on that side, is bounded by the sea. The other margin of the clay strata is bounded by the micaceous schist, and may be defined by a line drawn from Shankhill and passing to Enniskerry, and to the west of the great Sugar Loaf, and continuing in the same direction beyond Loch Dan. It includes the country around Bray, the Dargle, and Glen of the Downs; and also includes several extensive masses of quartz rock, such as Shankhill, the two Sugar Loafs, Bray Head, the Glen of the Downs, &c.

On the western side of the granite ridge, the commencement of the argillaceous schist may be seen, beyond Rathfarnham, where it is bounded by the river Dodder, which separates it from the micaceous schist; it then passes to the west of Seechon till it reaches the sources of the Liffey. There is often considerable difficulty in tracing the junction of the two schistose rocks, as they pass into each other by insensible gradations, and have both been greatly disturbed and contorted. The lower parts of the argillaceous schists often pass into greywacke schist, viz., into schist containing fragments of schistose rocks, which are fine in some cases, as near Bray, while they are coarse conglomerates near the Tallaght Hills.

Near the granite, these rocks undergo a very remarkable change; and as we trace them they gradually lose the stratified appearance, and even their schistose structure; they have become, in short, hard and compact, passing into a very close-grained green stone, consisting of hornblende and felspar, and where the crystals of felspar attain a larger size, a green stone porphyry is the result. In the ravines, portions of schorl in acicular crystals are very common, but they have not been traced to their source.

Lambay Island, to the north of Dublin, may be included under the head of argillaceous schist. The island consists of strata of schist and beds of green stone and porphyry. The schistose strata are much indurated and are contorted in a most intricate manner, and these contortions occur both on the minute and the great scale. These strata often lose their stratified appearance and pass into green stone and porphyry. The porphyry is sometimes amygdaloidal, containing nodules of calcareous spar. The crystals of felspar often exhibit a very peculiar laminar structure.

The QUARTZ ROCK exists in two states, either alternating with schist, and in that case decidedly stratified, or destitute of all foreign intermixture, and in these examples the stratification is very indistinct. The hills composed of quartz rock are easily recognized by their conical outline, a circumstance which has served to give names to some of them. The chief masses of quartz are Bray Head and Howth, in which it alternates with schistose strata; Shank-hill; and the greater and lesser Sugar Loaf, in which no schistose strata occur.

The quartz of the peninsula of Howth exhibits

the phenomenon of contorted strata in a very beautiful manner. The stratification is very obvious, and the schistose beds exhibit a great diversity of hues from purple to red, thus rendering the contortions more apparent. Some of the strata rest on their edges, others are undulated, and sometimes curved upon themselves, so as to resemble the concentric crusts of some spheroidal concretion. The same phenomenon is observable at Bray.

The only secondary rock that occurs in the vicinity of Dublin is the MOUNTAIN LIMESTONE, which constitutes all the country beyond the primary strata; occupying the counties of Meath and Kildare, and greater part of the county of Dublin. No limestone is found in the county of Wicklow, and the farmers of that county, on the eastern or sea side, obtain their supplies from Howth or from the beds of stratified calcareous alluvium, the only condition under which limestone occurs in that county. On the opposite side of the county the supplies of lime for building and agricultural purposes are chiefly drawn from the county of Carlow.

The limestone exists in two very distinct states in the vicinity of Dublin; in the one it has the charac-

ter of the ordinary carboniferous limestone, containing the usual organic remains ; but near the primary strata it is very impure, has a schistose structure, contains but few organic remains, and is the CALP of Kirwan. The calp is distinctly stratified, the strata seldom exceeding two feet in thickness and being separated by thin beds of slate clay. This limestone, which is much used for architectural purposes, occurs in many localities around Dublin, and every where exhibits marks of contortion and violence, which may be observed in almost every quarry around Dublin. At Lucan there is a beautiful example of contorted limestone strata ; and equally interesting instances may be seen at Portrane, where the sea coast has exposed numerous sections, in which the nature of the calp is fully displayed.

Besides the calp, magnesian limestone occurs in a few localities, as at Howth, near the junction of the primary and secondary strata, and on the Dodder between Milltown and Classon Bridge. This limestone contains no organic remains, but occasionally, as at Howth, we find it contains imbedded fragments of the mountain limestone.

MEMORANDUM,

&c. &c.

The following is a List of those Localities most deserving the Attention of the Geologist.

NORTH OF DUBLIN.

PORTRANE.—This peninsula consists chiefly of limestone, which is remarkably contorted, the strata resting on their edges, and curved in a very complicated manner.

LAMBAY ISLAND.—This island consists of conglomerate rocks of different kinds, chiefly of argillaceous schist, including fragments of other rocks. There is also a stratum of sandstone conglomerate at the northern extremity of the island. In some places the schist is greatly contorted. Greenstone and porphyry are extremely abundant, alternating with and passing into grey-wacke.

MALAHIDE.—The country in this vicinity consists entirely of mountain limestone. The quarries of Malahide, Feltram, and St. Doolagh, afford numerous organic remains.

The following is a list of organic remains collected from different situations :

<i>Articulata</i> .—Calymene	sp.	<i>Terebratula lineata</i> .
common everywhere.		_____ resupinata.
<i>Mollusca</i> .		_____ acuminata.
<i>Bellerophon hiuleus</i> .		_____ reniformis.
_____ costatus.		<i>Spirifer cuspidatus</i> .
<i>Ellipsolites ovatus</i> .		_____ attenuatus.
<i>Nautilus cariniferus</i> .		_____ trigonalis.
_____ biangulatus.		_____ glaber.
<i>Ammonites sphaericus</i> .		_____ obtusus.
<i>Orthocera striata</i> .		_____ striatus.
_____ fusiformis.		<i>Cardium hibernicum</i> .
<i>Amplexus coralloides</i> .		<i>Sanguinolaria gibbosa</i> .
<i>Cirrus acutus</i> .		<i>Zoophytes</i> .
<i>Euomphalus pentangularis</i> .		<i>Turbinolia Fungites</i> .
<i>Turitella</i> sp.		<i>Caryophyllea affinis</i> .
<i>Buccinum acutum</i> .		<i>Lithotroton floriforme</i> .
<i>Isocardia oblonga</i> .		_____ striatum.
<i>Productus comoides</i> .		<i>Tubipora catenata</i> .
_____ sulcatus.		

KILLESTER, near Clontarf.—Impressions of organized bodies occur in the upper beds of limestone ; these impressions are however so obscure, that nothing more than their vegetable nature can be inferred.

CLONTARF.—A vein of lead occurs in the limestone, which was worked a few years ago, but is now abandoned.

HOWTH.—The peninsula of Howth and the adjacent island of Ireland's Eye, consist chiefly of quartz

rock. The phenomena of contortions are here exhibited in great variety and distinctness. The quartz is interstratified with schistose rocks of a great variety of colours, rendering by their contrast the curvatures of the beds very apparent.

The following minerals occur in this locality :

Iron pyrites.	Oxide of manganese.
Copper pyrites.	Earthy black cobalt ore.
Galena.	

Beds of **MAGNESIAN LIMESTONE** occur at the north eastern extremity of Howth, at Sutton. These beds occur near the junction of the blue limestone with the primary strata; are interstratified with it, and include loose angular fragments thereof.

Near the town of Howth there is an extensive mass of stratified alluvium, attaining the thickness of about 100 feet, and containing fragments of marine shells of the same species as those which still exist in the adjoining sea.

IMMEDIATE VICINITY OF DUBLIN.

LUCAN.—The contortions of the limestone (calp) are displayed with great distinctness at the quarries near Lucan. The strata are perpendicular, some of them broken across, others folded and convoluted in a very complicated manner.

In the vicinity of Lucan there is a mineral spring, characterized by sulphuretted hydrogen.

DONNYBROOK.—In the quarries at Donnybrook there are numerous strata of calp, passing into the

ordinary limestone, and containing organic remains.

MILLTOWN.—Between Milltown bridge and Classon bridge there is a portion of magnesian limestone, which is included in the ordinary limestone. Granite is visible at a short distance from this place, but its contact with the stratified rocks has not been detected.

RATHGAR, CRUMLIN, and ROUNDTOWN.—The operations of quarrying have disclosed an extensive series of strata of calp limestone. The calp alternates with strata, and numerous such alternations may be counted. In all these quarries the limestone is highly inclined, and exhibits other indications of disturbance.

SOUTH OF DUBLIN.

BLACK-ROCK.—On the coast near the railway there are a series of rocks which are best observed at low water. The granite may be seen within a few feet of the limestone, but the actual contact of the two rocks cannot be observed. The limestone is hard and crystalline, and appears as if it had been shivered into angular fragments, which have been subsequently united.

KINGSTOWN.—The country around Kingstown and the Island of Dalkey consists entirely of granite. Almost every block of granite is traversed by concretionary veins of the same substance, differing from the general mass in the texture,

colour, and relative proportions of the usual ingredients.

The following minerals have been found in the granite :

Spodumene.	Garnet.
Killinite.	Tourmaline.
Beryl.	Apatite.
Fluor.	Rutile.
Copper pyrites.	Sphene.
Iron pyrites.	Orthite.
Galena.	

} These extremely
rare.

KILLINEY.—On the sea coast, immediately below the obelisk, the junction of the granite with the mica schist occurs. The edges of the schistose strata repose on a basis of granite. The schist is much contorted, and sometimes so convoluted as to form concentric crusts. At the line of junction the schist abounds in crystals of Andalusite grouped in a stelliform manner.

Numerous veins issue from the granite, and intersect the micaceous schist; some of the veins run parallel to the lamination of the schist, others run parallel to the direction of its stratification, and consequently one set of veins intersects the other.

In one instance a heave has taken place, and the two portions of the granite vein are displaced.

These veins frequently contain fragments of micaceous schist.

ROCHESTOWN HILL.—The line of junction of the

schist with the granite may be traced for a quarter of a mile, and is remarkable for its clearness and precision.

In this locality the spheroidal structure of the granite may be observed.

SCALP.—A deep ravine has cut across the granite and schist, so that their contact may be easily observed. The schistose rocks recline against the granite, and are much contorted. Crystals of Staurotide occur near the Scalp.

BALLYCORUS.—At a very short distance from the Scalp a vein of lead ore occurs near the junction of the schist and granite.*

Galena, sulphate of barytes and carbonate of lead are found here.

SHANKHILL.—This hill is composed of quartz rock, and its stratification is not very apparent. On the west side of the hill, where it approaches the granite, the quartz is changed into hornstone.

BRAY HEAD consists of quartz rock and argillaceous schist in frequent alternation. The strata in many places rest on their edges, and are turned and contorted in every direction, exhibiting phenomena analagous to those observed at Howth.

* This vein has been worked by different mining companies, and is at present in the possession of the Mining Company of Ireland, who have works for smelting, and for rolling and drawing pipes. Shot is also manufactured here.

To the south of Bray there is an extensive mass of alluvium containing broken shells.

GREATER and LESSER SUGAR LOAF.—These hills consist of quartz rock without any argillaceous schist, and their stratification is obscure.

RATHFARNHAM.—The junction of the granite and micaceous schist may be observed near the commencement of the Military Road.

GLENISMAULE.—The junction of the granite and schist may be traced to a considerable distance on the southern side of the valley.

In this situation there are extensive beds of alluvium, consisting chiefly of rolled fragments of limestone, and covering the base of the hills to a height of 100 feet.

BALLINASCORNY.—Strata of green-stone and green-stone porphyry may be seen in the deep natural sections with which this part of the country abounds. These green-stones graduate into the schistose rocks.

TALLAGHT HILLS consist of clay slate with grey-wacke slate, with occasional beds of green-stone.

APPENDIX.

TABLE OF HEIGHTS OF MOUNTAINS

ABOVE LOW WATER MARK IN DUBLIN BAY.

Names.	Authorities.	Feet.
LUGNAQUILLA,	Mr. Richard Griffith,	3070
	Dr. Fitton,	3045
HEAD OF KIPPURE, . .	Messrs. Griffith and Weaver, conjointly,	2527
DJOUCE,	Ditto,	2392
SEECHON,	Mr. Hugh Hamill,	2150
GREAT SUGAR LOAF, . .	Dr. Taylor and Mr. Weaver,*	2004
THREE ROCK MOUNTAIN,	Dr. Fitton and Mr. Weaver, .	1585
LESSER SUGAR LOAF, .	Messrs. Griffith and Weaver, .	1183
BRAY HEAD,	Ditto,	807
HILL OF HOWTH, . . .	Dr. Fitton,	578

NOTE.—It was hoped, that the measurements of some of these heights, by the officers engaged in the Trigonometrical Survey, would have been obtained in time for this publication, but it was of necessity sent to press without them.

* Later observations have placed the height of the greater Sugar Loaf below this.

ALPHABETICAL NOTICE

Of Places mentioned in the preceding pages, and of some others in the Vicinity of Dublin ; with their Bearings and Distance from the Castle of Dublin, in Irish Miles.

N. B.—The proportion of Irish to English miles is as 11 to 14.

BALINASCORNEY. A mountain village, six miles, S. W.

BLACK-ROCK. A town on Dublin Bay, four miles, S. E.

BRAY. A town on the sea coast, on border of county Wicklow, ten miles, S. S. E.

BRAYHEAD. Sea shore, mile and a half, S. E. of Bray town.

CABINTEELY. Village, six miles and a half, S. on road to Bray.

CLASSON BRIDGE. On the river Dodder, above Milltown, two miles, S.

CLONTARF. A town on sea shore, two miles, N. E.

CRUMLIN. A village, two miles, W. by S.

DALKEY. A town, seven miles and a quarter, S. E.

DALKEY ISLAND. Eight miles, S. E.

DARGLE. A glen, through which the Bray river passes, one mile and a half above the town of Bray.

DJOUCE. A mountain, above Powerscourt Waterfall, eleven miles, S., and about seven miles S. W. of the town of Bray.

DODDER. A river, which flows at the distance of about two miles, on the south side of Dublin. It rises in Glenismaule, about eight miles S. W. of the city, and after a winding course of nearly twenty miles, falls into the river Liffey near its mouth at Ringsend.

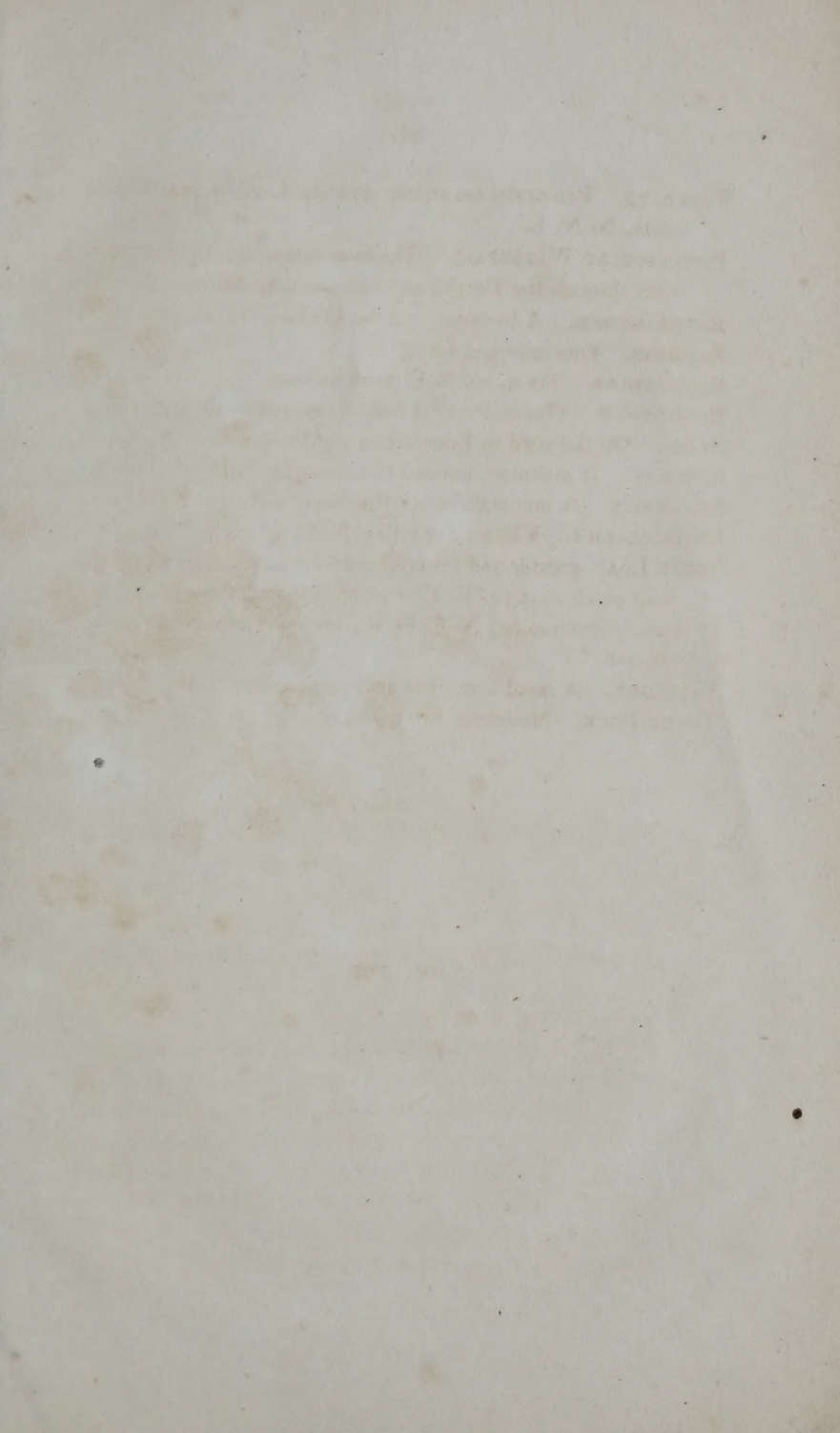
DONNYBROOK. On the river Dodder, one mile and three quarters, S.

DUNDRUM. A village, three miles and a half, S. by E.

- ENNISKERRY. A small town, nine miles and three quarters, S. S. E.
- FELTRIM. A village, five miles, N. E.
- GLENCULLEN. Seven miles and three quarters : a branch of the Bray river flows from it.
- GLENCREE. Nine miles and a half, S., on the great Military Road. A branch of the Bray river flows from it.
- GLEN OF THE DOWNS. County Wicklow, on the mail coach road, fourteen miles, S. S. E., a little beyond the Great Sugar Loaf.
- GLENISMAULE, or GLENISMOOL. Seven miles, S. S. W. The river Dodder rises in the distant part of the glen.
- HOWTH. Town, and hill of same name, seven miles and a half, E. by N.
- IRELAND'S EYE. A small island, half a mile north of town of Howth.
- KILLESTER. Three miles, N. E.
- KILLINEY. Hills and village, seven miles, S. E.
 ————— Bay to the south of the hill.
- KINGSTOWN. Five miles and a half, S. E.
- KIPPURE. A mountain, eleven miles, S. by W.
- LAMBAY. An island, ten miles, N. E. About two miles from the main shore.
- LOUGH DAN. In county Wicklow, nine miles, S. W. from Bray.
- LUCAN. Small town, four miles and a half, W. on the river Liffey.
- LUGNAQUILLA. The highest mountain in this part of Ireland, situated in the county of Wicklow, about twenty-five miles, S. S. W., and thirteen miles W. of the town of Wicklow.
- MALAHIDE. Small town and sea port, seven miles and a half, N. N. E.
- MILITARY ROAD. Begins above Rathfarnham, three miles, S., and extends over the mountains into the county Wicklow.
- MILLTOWN. On the river Dodder, two miles, S.
- MOUNTPELLIER. One of the lesser mountains, five miles and a half, S. S. W.

- PORTRANE.** Peninsula, sea shore, opposite Lambay Island, nine miles, N. N. E.
- POWERSCOURT WATERFALL.** Thirteen miles, S., river from it runs through the Dargle, and into the sea at Bray.
- RATHFARNHAM.** A town beyond the Dodder, three miles, S.
- RATHGAR.** One mile and a half, S.
- ROCHESTOWN.** Six miles, S. E. near Killiney.
- ROUNDTOWN.** One mile and a half, S., on road to Rathfarnham.
- SCALP.** On the road to Enniskerry, eight miles, S. S. E.
- SEECHON.** A mountain beyond Glenismaule, eight miles, S. W.
- SHANKHILL.** A mountain above the Scalp, eight miles, S. by E.
- ST. DOOLAGH'S.** Village, five miles, N. E.
- SUGAR LOAF,** greater and lesser. thirteen miles, S. by E.; the mail coach road to Wicklow passes between them.
- SUTTON.** Seven miles, N. E. by E., on the isthmus of Hill of Howth.
- TALLAGHT.** A small town, five miles and a half, S. W.
- THREE ROCK.** Mountain, five miles, S.

THE END.







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